

CLAIMS

What is claimed is:

1. An ultrasonic inspection assembly comprising:
an ultrasonic transducer mounted on a stage;
a support structure having a proximal end adjacent to said stage
and a terminal end opposite to said stage, said support structure defining an
interior space filled with a media which transmits ultrasonic waves;
wherein said stage and said proximal end of said support
structure are coupled to one another, and said transducer is oriented such
that it transmits ultrasonic waves through said media; and
a drive mechanism for rotating one of said stage and said
support structure relative to the other one of said stage and said support
structure.
2. The ultrasonic inspection assembly of claim 1 wherein said
stage rotates relative to said support structure.
3. The ultrasonic inspection assembly of claim 1 wherein said
media is water.
4. The ultrasonic inspection assembly of claim 1 wherein said
transducer is arranged to direct ultrasonic waves through said media to said
terminal end and then to a target.

5. The ultrasonic inspection assembly of claim 1 wherein said target is a resistance spot weld joint.

6. The ultrasonic inspection assembly of claim 1 wherein said interior space within said support structure has a distance from said proximal end to said terminal end that optimizes a shape of an ultrasonic beam emitted from said transducer.

7. The ultrasonic inspection assembly of claim 1 wherein said stage and said support structure are coupled to one another by a coupling that comprises a seal to prevent or at least minimize leakage of fluid from said proximal end of said interior space to an exterior of the assembly.

8. The ultrasonic inspection assembly of claim 1 wherein at least a portion of said terminal end in contact with a target.

9. The ultrasonic inspection assembly of claim 1 wherein said terminal end is substantially sealed from fluid communication from said interior space to an exterior of the assembly by a seal.

10. The ultrasonic inspection assembly of claim 9 wherein said seal of said terminal end comprises a compliant polymeric material diaphragm.

11. The ultrasonic inspection assembly of claim 10 wherein at least a portion of said diaphragm is in direct contact with a target.

12. The ultrasonic inspection assembly of claim 1 wherein said terminal end has an aperture to permit a small continuous flow that establishes a continuous path of said media from said terminal end to a target.

13. The ultrasonic inspection assembly of claim 1 wherein said stage is coupled to said support structure by a retaining ring, said retaining ring having an interior circumference comprising a ring gear, and said drive mechanism comprising a pinion which traverses along said ring gear to provide rotational movement of said stage relative to said support structure.

14. The ultrasonic inspection assembly of claim 1 wherein said ultrasonic transducer is a high-frequency linear phased array ultrasonic transducer.

15. The ultrasonic inspection assembly of claim 1 wherein said support structure has a length of less than about 25 mm.

16. An ultrasonic inspection assembly for testing resistance spot welds comprising:

- a high frequency linear phased array ultrasonic transducer mounted on a stage;

- a support structure having a proximal end adjacent to said stage and a terminal end opposite to said stage and in contact with a resistance spot weld target, said support structure defining an interior space filled with a media which transmits ultrasonic waves, wherein said transducer is arranged to direct ultrasonic waves through said media to said spot weld target, wherein said stage and said proximal end of said support structure are coupled to one another; and

- a drive mechanism for rotating said stage relative to said support structure.

17. A method for non-destructive ultrasonic testing comprising:
positioning an ultrasonic detection assembly over a target;
contacting a terminal end of said detection assembly with a surface of said target;
activating an ultrasonic transducer to transmit ultrasonic waves through said proximal end to said target;
registering any ultrasonic waves reflected from said target to said transducer; and
moving said transducer relative to said proximal end to reposition said transducer.

18. The method according to claim 17, wherein said moving comprises rotating said transducer relative to said proximal end.

19. The method according to claim 18 wherein said rotating is conducted by a drive mechanism to rotationally reposition said transducer.

20. The method according to claim 17 wherein said positioning includes positioning said transducer relative to a first area of said target and said moving includes repositioning said transducer to a second area of said target, relative to said first area.

21. The method according to claim 17 wherein said moving is conducted while maintaining contact between said terminal surface and said target.

22. The method according to claim 17 wherein after said moving contact between said terminal end with said target is re-established.